



Goals, Priorities, & Resources (APS upgrade discussion)

K.-J. Kim

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Upgrade Path

- Near term(< 5 yrs)
 - Maximize APS scientific output with minimum disruption
- Long term: APS-II
 - Exciting horizon



APS-II

- XPS: Ultra-low emittance (75 pm) ring
- ERL in APS ring
- *APS-II could begin in 5 years if start to work on it now.*



User Wishes

- Small emittance: $\varepsilon < 3\text{nm}$
- Beam stability
- Top-up @ 2 minutes
- Shorter period, longer undulators
- Variable, adjustable, and/or converging beta
 - Can also do with beam line optics!
- Higher single bunch current
 - 5mA to 15 mA
- Polarization switching
- Round beams?
- (Higher current)



Near Term Priorities

- Highly stable, well-characterized, 3 nm SR
- Shorter wavelength, longer ID
- *Improved beam line optics (taking care of the unique properties of SR)*



Storage Ring

- MB-LE list
- Optimum lattice @ 3 nm, 1-2% coupling
- Beam stabilization
- Accurate machine modeling
- Injector improvement
- Harmonic cavities for 15 mA(single bunch)?



Beam stabilization

- GD's upgrade plan with priorities and time line
- Beam centering in BPLD window



Machine Modeling

- Linear & nonlinear lattice
- Injection
 - Important for instability study & to prevent ID damage
- Impedance and instabilities
- Tools:
 - Response matrix, MIA(needs beam history module)*
 - Theory & simulation*



ID Development

- End-field correction for variable gap
- Helical undulators?
- Polarization switching
- Long undulators
- *Superconducting undulators for shorter period, higher K . Is this near term?*



Improved Beam Line Optics

- Match SR source to the beam line needs (change Raleigh range)
 - Compound refractive lenses?
- Use beam line signal for alignment or FB
- etc



Work Plan

3 year plan with resources and study time requirements. Draft by April 26.

- Ring improvement A (lattice) – MB
- Ring improvement B (beam dynamics) – SM
- Stability – GD
- ID – LM
- Beam line – DM?



Schedule

- April 19: I am on travel
- April 26: Discussion of work plan
& APS-II
- May 3: IFCA at Spring8
- May 10: BK on SCID's
NS on booster/PAR
- May 17: Retreat